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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

January 1998

The 6-month smoothed growth rates of the latest metal industry leading indexes have declined significantly from their levels of recent months. However, most of the growth rates still remain above +1.0%, and overall industry activity should continue to grow slowly in the near term. The metals price leading index was up slightly in November, pointing to the possibility of higher metal prices. But metals inventories remain high, and high inventory levels could continue to hold down price growth in the immediate future.

The **primary metals leading index** decreased 0.4% in December to 126.4 from a revised 126.9 in November. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, slipped to 2.3%, the lowest growth rate of 1997.

Only four of eight index components were available for the December index calculation, so the latest value for the primary metals leading index should be considered preliminary. Most of the December decrease in the leading index was attributable to the Purchasing Managers' Index, which dipped to its lowest level since last January. The growth rate of the Journal of Commerce metals price index also declined, but the S&P stock price index for diversified machinery posted an increase. The fourth available component, the average workweek in primary metals establishments, was unchanged in December.

The declining growth rate of the primary metals leading index suggests that growth in industry activity may slow in the coming months.

The **steel leading index** was essentially flat for the second month in a row in November, edging down to 106.7 from a revised 106.8 in October. The index's 6-month smoothed growth rate slipped to 4.5% from a revised 5.6% in October. The industrial production index for automotive products made the largest positive contribution to the leading index, while the S&P stock price index for steel companies made the largest negative contribution. The leading index suggests that growth in the domestic steel industry may slow in the near term.

The **aluminum mill products leading index** fell 1.6% in November to 145.4 from a revised 147.8 in October, while the index's 6-month smoothed growth rate slid to 2.9%, the lowest rate since December 1996. Commercial and industrial construction contracts, net new orders for aluminum mill products, and average weekly hours in aluminum sheet, plate, and foil establishments made sizable downward contributions to the index. The 1-month drop in the aluminum mill products leading index is not necessarily a signal of a decrease in future activity in that industry. The growth rate trend still suggests moderate growth for aluminum mill products activity in the near future.

The **primary and secondary aluminum leading index** decreased 0.4% in November to 244.3 from a revised 245.2 in October. The index's 6-month smoothed growth rate slowed to 4.6% from a revised 6.7% in October. The S&P stock price index for aluminum companies was by far the greatest factor in the November index decline. Although it has dropped significantly over the past 3 months, the growth rate of the primary and secondary aluminum leading index still points to growing U.S. demand for aluminum. Competition from imports, however, may limit growth in domestic primary aluminum activity. (Tables and charts for the primary and secondary aluminum indexes are in a separate file.)

The MII copper stock price index, which dipped to its lowest level since November 1995, helped pull the **copper leading index** down 0.7% in November to 120.9 from a revised 121.7 in October. More importantly, the copper leading index's 6-month smoothed growth rate fell to -1.6%, the first negative growth rate of any of the leading indexes in 1997. The leading index points to weak near-term growth in the domestic copper industry.

Metals Price Leading Index and Metal Inventories Increase

The metals price leading index edged up 0.2% in November, moving to 97.9 from a revised 97.7 in October. However, the 6-month smoothed growth rate of this index eased to 2.6% from a revised 2.8% in October. The leading index of metal prices, a measure of possible future demand for metals, signals changes in the

growth rate of nonferrous metal prices an average of 7 months in advance. Two of the three index components that were available for November increased. These were the growth rates of deflated new orders for U.S. nonferrous metals and the deflated M2 money supply. In contrast, the growth rate of building permits for new housing units moved lower. The fourth index component, the growth rate of the Organization for Economic Cooperation and Development (OECD) total leading index was not available for November. Growth in the OECD leading index, however, has been strong through October, and it does not yet appear to reflect any effects from the economic crisis in East Asia, which have helped push metal prices down in recent months. The OECD leading index leads industrial production in the OECD countries by about 6 months.

The growth rate of the deflated value of nonferrous metal products inventories held in the United States increased to 10.6% in November, the sixth consecutive monthly increase. This growth rate is a measure of changes in the supply of nonferrous metal products in the United States.

Although the growth rate of the metals price leading index points to an upward near-term trend in prices, increases in inventory levels and concerns about East Asian economies may continue to hold down growth in metals prices over the next few months. It is important to recognize that the business cycle and inventories are only two factors in price determination. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, and production costs.

An explanation of the indexes and the 6-month smoothed growth rates appears on page 12.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
1996						
November	94.8	2.1	6.3	-2.8	11.9	-26.3
December	95.0	-6.9	5.3	-2.0	-11.2	-21.8
1997						
January	95.8	6.5	-0.2	9.8	6.6	-6.6
February	96.5	11.0	-0.9	12.7	10.5	3.7
March	96.7	10.4	-3.7	10.1	11.2	-3.3
April	96.3r	9.7	-3.7	10.8	12.2	-8.5
May	96.1	18.4	-5.1	11.0	30.7	2.0
June	96.2	15.1	-3.3	5.1	25.8	3.4
July	96.9r	16.2	2.6	21.0	3.4	11.6
August	97.9r	4.8	3.1	4.6	-12.5	13.6
September	98.6r	1.2r	3.3	9.3	-15.9	4.6
October	97.7r	-8.6r	6.2r	3.6	-25.3	6.7
November	97.9	-16.9r	10.6	-1.9	-35.9	13.8
December	NA	-21.7	NA	-7.9	-41.3	10.8

r *- Revised*

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

Link To:

Chart 1.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1997				
January	121.3r	2.5	109.3r	3.0
February	122.5r	3.9	109.9r	3.5
March	123.4r	4.8r	110.0r	3.1r
April	124.1r	5.3r	110.7r	3.9r
May	125.0r	6.3r	110.5r	2.9r
June	125.4r	6.2r	111.0r	3.3r
July	126.3r	6.9r	111.2r	3.0r
August	127.4r	7.7r	111.8r	3.5
September	127.2r	6.3r	112.1r	3.5r
October	127.4r	5.7r	112.9r	4.3r
November	126.9r	3.9r	113.3	4.5
December	126.4	2.3	NA	NA

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**November**	**December**
1. Average weekly hours, primary metals (SIC 33)	0.2r	0.0
2. S&P stock price index, machinery, diversified	-0.6r	0.3
3. Ratio of price to unit labor cost (SIC 33)	0.0	NA
4. JOC metals price index growth rate	0.0r	-0.3
5. New orders, primary metals, (SIC 33) 1982$	0.2	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 1992$	0.1	NA
8. Purchasing Managers' Index	-0.2r	-0.4
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.4r	-0.4

Coincident Index	**October**	**November**
1. Industrial production index, primary metals (SIC 33)	0.2r	0.1
2. Total employee hours, primary metals (SIC 33)	0.3	0.2
3. Value of shipments, primary metals, (SIC 33) 1982$	0.0	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.6r	0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA*: Not available* ***r*** *- Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

Links To:

Chart 2.

Chart 3.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
December	102.4r	0.2r	98.7	1.2r
1997				
January	102.7r	0.7r	99.2r	1.8r
February	103.5r	2.0	99.0	1.3r
March	103.9r	2.8r	99.2	1.4
April	103.8r	2.1r	99.7r	2.1r
May	103.9r	2.3	99.4r	1.2r
June	104.5r	3.3	99.6r	1.4r
July	104.2r	2.7r	99.5r	1.0
August	106.1	5.7r	99.8	1.4
September	106.7r	6.2r	100.5r	2.4
October	106.8r	5.6r	100.7r	2.7r
November	106.7	4.5	100.8	2.4

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**October**	**November**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.1	0.0
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982$, (SIC 331)	0.0	0.0
3. Shipments of household appliances, 1982$	0.1r	-0.1
4. S&P stock price index, steel companies	-0.4	-0.3
5. Industrial production index for automotive products	-0.1r	0.3
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.0	0.1
7. Index of new private housing units authorized by permit	0.1	-0.1
8. Growth rate of U.S. M2 money supply, 1992$	0.0	0.1
9. Purchasing Managers' Index	0.2	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.0r	-0.2
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	0.3r	0.1
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982$	-0.1r	-0.1
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.0r	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.3r	0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 4.

Chart 5.

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
December	139.9r	2.6r	124.5	2.6r
1997				
January	140.7r	3.3r	123.7r	1.0r
February	142.7r	5.4r	125.6r	3.3r
March	142.7r	4.7r	126.0r	3.5r
April	143.4r	4.8r	125.9r	2.9r
May	143.6r	4.5	125.5r	1.8r
June	143.4r	3.8	126.8	3.5
July	143.7r	3.8r	127.3r	3.7r
August	144.4r	4.2r	126.6r	2.0r
September	146.5r	6.3r	126.1r	1.0r
October	147.8r	7.3r	127.0r	2.2r
November	145.4	2.9	127.9	3.1r

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**October**	**November**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.5	-0.5
2. Index of new private housing units authorized by permit	0.1	-0.2
3. Industrial production index for automotive products	-0.1r	0.4
4. Construction contracts, commercial and industrial (square feet)	0.1	-0.8
5. Net new orders for aluminum mill products (pounds)	-0.1	-0.6
6. Growth rate of U.S. M2 money supply, 1992$	0.0	0.1
7. Purchasing Managers' Index	0.2	-0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.8r	-1.7
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	0.3r	0.2
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.3	-0.3
3. Shipments of aluminum mill products (pounds)	0.0r	0.7
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.7r	0.7

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted.

NA: Not Available *r - Revised*

Links To:

Chart 6.

Chart 7.

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
December	120.2	2.1	114.5r	1.5r
1997				
January	120.2	1.9	114.1r	0.8r
February	122.0	4.2	114.4r	1.1r
March	123.5	6.1	114.2r	0.6r
April	121.8	2.7	114.6r	1.0r
May	122.7	3.9	113.6r	-0.9r
June	122.8	3.7	114.2r	0.1r
July	121.7	1.4	114.0r	-0.4r
August	122.3	1.9	114.8r	1.0r
September	123.4	3.2	115.8r	2.3r
October	121.7r	0.0r	116.0r	2.5r
November	120.9	-1.6	115.8	2.1

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**October**	**November**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.0	0.0
2. New orders, nonferrous and other primary metals, 1982$	-0.8r	0.3
3. MII stock price index, copper companies	0.0	-0.8
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	-0.5	0.2
5. Growth rate of the LME spot price of primary copper	-0.2	-0.2
6. Index of new private housing units authorized by permit	0.1	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-1.4r	-0.7
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	-0.2	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.1r	0.2
3. Copper refiners' shipments (short tons)	0.2r	-0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.2r	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3 and 5 of the leading index.

NA: *Not available* ***r*** *- Revised*

Links To:

Chart 8.

Chart 9.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Three of the metal industry coincident indexes, those for primary metals, steel, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. Two of the coincident indexes, one for copper and one for primary and secondary aluminum, are blends of two different copper and aluminum industries, respectively.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals, 8 months for steel, and 7 months for copper. The average lead time for the leading indexes of aluminum mill products and primary and secondary aluminum is 6 months.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

The leading index of metal prices, also published in the Metal Industry Indicators, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the Metal Industry Indicators is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EST, Friday, February 20. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for Metal Industry Indicators on the World Wide Web is: http://minerals.er.usgs.gov/minerals/pubs/mii/

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